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See application file for complete search history.

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(57) **ABSTRACT**

A method for determining an orientation of a portable c

mobile electronic device includes determining an orientation of the mobile electronic device relative to the first location, and determining a second location based on the orientation and the first location.

of the device using at least a first inertial motion sensor (e.g.

a gyroscope) with which the portable electronic device

equipped. A correction factor is provided to the orientation of

the electronic device using a feedback control signal based on motion data obtained from at least a second inertial motion sensor (e.g. an accelerometer) to reduce drift in motion data obtained from the first inertial sensor. Responsive to a loss of valid motion data from the first inertial motion sensor, a ratio at which the correction factor is provided to the orientation of the portable electronic device is increased.

19 Claims, 4 Drawing Sheets

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